



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,321	04/16/2004	Christian Marty	251928US41	7891
22850	7590	09/22/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER EMPIE, NATHAN H	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 09/22/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/825,321	<b>Applicant(s)</b> MARTY ET AL.	
	<b>Examiner</b> NATHAN H. EMPIE	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 9-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/16/08 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 and 10-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added claim limitation "pouring molten titanium on the coating of the mullite container" was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The invention is directed toward a method for treating a contact surface for mullite-based refractory recipient, and a coating made with this method, and the

Art Unit: 1792

applicant's specification teaches "an alumina contact layer that is perfectly pure and able to enter into contact with molten titanium without chemically reacting with it" (pg 3 lines 5 – 14) but the specification does not contain any functional recitation of pouring molten titanium on the coating of the mullite, to support such an amendment.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 10 - 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (patent number 4,664,969 hereafter '969), in view of Bolt et al. (patent number 5,807,798, hereafter '798), Takayanagi et al (patent number 5,394,933 hereafter '933), Bell et al. (patent number 7,138,084 B2 hereafter '084) and the admitted prior Art (hereafter "APA"), pages 1-2.

With respect to claim 1, 4, 10 and 11, '969 teach a method of coating a surface with refractory material [col 2, lines 43-45]. The refractory coating is made of alumina with binder [abst.]. Specifically, the binder is made of 50% aluminum chloride and 50% water solution [col 6, example 4, and lines 53-54]. '969 further teach that the solution is applied by air pressure from a pneumatic apparatus (air brush) [fig 1, spraying apparatus (14)], follow by a drying step [example 4, line 61] and sintering to a temperature of up to 2400°F for 7.5 hours [see, for example, example 4, lines 62-64].

Art Unit: 1792

Per claim 10, the ramp rate and cool rate would have been determined by one of ordinary skill, based upon the materials being thermally treated, to optimize sintering, porosity and adhesion, as well as minimize detrimental thermal shock. '969 does not specifically teach the refractory material being applied to a mullite container, nor does it teach alumina being flour, nor a step of pouring molten titanium on the coating of the mullite container. '798 teaches a refractory filler and binder material applied to the surface of a refractory container made mainly of mullite [col 1, line 54-58] and the filler has been subjected preliminary milling before mixing [col 5, line 57-60]. Further the APA teaches to coat mullite containers capable of contacting molten titanium with alumina, but wherein the silica binder is detrimental because it reacts with the titanium. Further, '933 teaches that it is well known in the art to apply alumina coatings to mullite containers and substrates, as they will predictably serve to prevent molten metal coatings such as titanium from reacting with the underlying mullite (see, for example, col 1 lines 39 - 49, col 2 lines 30 - 34). Further '933 teaches pouring molten titanium onto an alumina coated mullite container to obtain a cast titanium article (see, for example, col 1 lines 39 - 49, and col 4 lines 554 - 57). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the coating of '969 using an aluminum chloride binder on the mullite as taught by '798 and specifically the mullite container of the APA and '933 to eliminate the detrimental silica binder and replace it with an inert alumina binder, and further to pour molten titanium on the coating of the mullite container as taught by '933 to form a cast titanium article.

Art Unit: 1792

'969, '798, APA and '933 do not explicitly teach firing in an oxidizing atmosphere although firing in the air is apparent. '084 teaches firing of the container in an atmosphere where a supply air is passed [col 11, lines 35-36]. It would have been obvious to one of ordinary skills in the art at the time the invention was made to have modified the process of '969, '793, '933 and the APA in air during sintering in order to form a stable oxide coating which converts the aluminum chloride to alumina.

Claim 12: '969 in view of '798, '933, APA and '084 teach the method of claim 1, but they do not explicitly teach firing being performed for less than one hour. As the duration of heat treatment influences coating density, grain size, etc; it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated firing for a period of less than one hour since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 2-3, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over of '969 in view of '798, '933, the APA, and '084 as applied to claim 1 above and further in view of Mills (patent number 5,143,777, hereafter '777).

With respect to claims 2-3 and 9, '969, '798, '933, APA, and '084 teach the limitation of claim 1. They do not teach that the coating also comprises a water-soluble organic dye methylene blue in a total proportion of 0.1% to 0.5% by weight. '777 teach that methylene blue dye (which is pyrolyzable) in a coating reveals no cracks [col 4, line 5-6]. It would have been obvious to one of ordinary skills in the art at the time of the

Art Unit: 1792

invention to have added methylene blue dye to reveal no cracks because '777 teaches that it is a suitable method. With respect to the proportion of 0.1% to 0.5%, such small proportions are considered trace amounts routinely in experimentation. Therefore it is prima facie obvious not to optimize them as result effective variable.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over '969 in view of '798, '933, APA, and '084 as applied to claim 1 above, and further in view of Tawil et al (patent number 5,725,955, hereafter '955).

With respect to claim 5, '084 further teaches 55-70%  $\text{Al}_2\text{O}_3$  [col 3, line 24] filler and 30-45% binder [col 3, line 24]. '084 do not teach application by brush. '955 teach a suspension containing alumina is applied by brush [abst]. It would have been obvious to one of ordinary skills in the art at the time the invention was made to have used a brush to apply a slurry to a surface because '955 teaches that it is a suitable method. With respect to claims 5/2 and 5/3 are rejected over Rossi ('969), Bolt ('798), Bell ('084) and Mills ('777) as applied to claims 2 and 3 and 9 further in view of Tawil for the same reason stated immediately above.

### **Response to arguments**

Applicant's arguments filed 7/16/08 have been fully considered but they are not persuasive. Applicant's arguments that the references do not teach the newly added limitations are unconvincing in view of newly-cited Takayanagi ('933) reference, as discussed above.

In response to applicant's arguments directed differences between the prior art and the claimed weight percentages of  $\text{AlCl}_3$  in water. The examiner maintains that applicant's specification shows no criticality or unexpected results, beyond normal process parameters readily ascertainable by one of ordinary skill in the art, example optimizing, viscosity, liquid level, etc. Since binder quantity could be dependant upon the size/surface area of the alumina particles used, optimization of the amount of binder would have been an apparent process variable. Obviousness—Routine experimentation, Discovery of optimum ranges within prior art general conditions. In re Aller et al 105 USPQ 233. Obviousness—Change of form, changes of size, degree, shape, proportion, and sequence of adding ingredients. In re Rose, 105 USPQ 237; In re Aller et al 105 USPQ 233; In re Dailey et al 149 USPQ 47; In re Reese 129 USPQ 402; In re Gibson 5 USPQ 230; MPEP 2144.04 IV. Patentably- Change-In general (§51251) Mere adjustment of features to achieve optimum results is not patentable, nor will change in form, proportion or degree support patentability. Thus, the variation in binder amounts does not patentably distinguish over the PA. Further the proposed support (portions of the applicant's specification to where applicant has directed the examiner's attention) to demonstrate unexpected results / criticality of the ranges lacks sufficient scientific evidence (for example, no comparison data to different coating composition weight ratios and resulting properties). Therefore the examiner is unconvinced that such a demonstration is sufficient to outweigh the evidence of obviousness.



In response to applicants arguments directed toward the combinability of '969, '798 and APA, the examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). In this case, '969 has taught an alumina chloride binder system applied to a silica containing refractory. Both '798 and APA teach applying refractory filler and binder materials to mullite (silica containing refractory) surfaces, and APA has further taught coating mullite containers capable of contacting molten titanium with alumina (where silica is taught to be detrimental). Taking the references as whole would suggest to one of ordinary skill in the art to make such a combination as it would eliminate the detrimental silica binder and replaces it with an inert alumina binder. Accordingly, the applicant's arguments are unconvincing, and the final rejection stands. Further the incorporation of '933 into the rejection of claim 1 provides further support for the desirability for applying alumina coatings to refractory mullite container surfaces (described above).

Applicant's arguments as presented are not persuasive and the claims are rejected.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./  
Examiner, Art Unit 1792

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1792